

1. Apparatus for introducing granular mold flux onto the top of a slab being cast within a continuous casting mold; the apparatus comprising:

5 a source of granular mold flux;  
an intermediate hopper;  
transfer means for transferring the granular mold flux from the source of granular mold flux to the intermediate hopper; and  
10 delivery means for feeding the granular mold flux from the intermediate hopper to the top of the slab being cast within the continuous casting mold, the delivery means including  
at least one delivery tube assembly  
interconnected with the intermediate hopper,  
and  
15 a variable diameter pinch valve for controlling the flow rate of the granular mold flux from the intermediate hopper through the delivery tube.  
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2. The apparatus for introducing granular mold flux onto the top of a slab being cast within a continuous casting mold as set forth in claim 1 wherein the delivery tube assembly includes a flexible line and an inline air pump which assures a positive flow of granular mold flux through the delivery tube assembly.  
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3. The apparatus for introducing granular mold flux onto the top of a slab being cast within a continuous casting mold as set forth in claim 1 wherein a tundish is the source of the material being cast, the material exiting the tundish to the mold via a ceramic pouring tube, and wherein the delivery means delivers granular mold flux to either side of a ceramic pouring tube.  
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4. The apparatus for introducing granular mold flux onto the top of a slab being cast within a continuous casting  
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5 mold as set forth in claim 3 wherein there are first and second delivery tube assemblies, the first having a delivery tube to one side of the ceramic pouring tube and the second having a delivery tube to the other side of the ceramic pouring tube.

10 5. The apparatus for introducing granular mold flux onto the top of a slab being cast within a continuous casting mold as set forth in claim 3 wherein there is a single delivery tube assembly, the delivery tube having a discharge branches which can deliver granular mold flux to either side of a ceramic pouring tube.

15 6. The apparatus for introducing granular mold flux onto the top of a slab being cast within a continuous casting mold as set forth in claim 1 wherein the variable diameter pinch valve is located at that end of the delivery tube assembly which is closest to the intermediate hopper.

20 7. The apparatus for introducing granular mold flux onto the top of a slab being cast within a continuous casting mold as set forth in claim 1 wherein the intermediate hopper is provided with a sensor for controlling the level of granular mold flux within the hopper, the sensor turning the transfer means "off" if covered with flux, but turning the transfer means "on" if the flux should fall below the level of the sensor.

30 8. The apparatus for introducing granular mold flux onto the top of a slab being cast within a continuous casting mold as set forth in claim 1 wherein the diameter of the pinch valve is optimally 1 inch, and the diameter of the deliver tube is at least 1 inch.

35 9. The apparatus for introducing granular mold flux onto the top of a slab being cast within a continuous casting mold as set forth in claim 1 wherein the variable diameter

pinch valve is a pneumatically operated pinch valve, an operator remotely controlling the opening of the pinch valve via a visual inspection of the level of flux upon the mold being cast.

10. The apparatus for introducing granular mold flux onto the top of a slab being cast within a continuous casting mold as set forth in claim 1 wherein the delivery tube assembly includes a flexible tube between the pinch valve and the delivery tube.

11. The apparatus for introducing granular mold flux onto the top of a slab being cast within a continuous casting mold as set forth in claim 1 wherein the transfer means is vacuum transfer system.

12. Apparatus for introducing granular mold flux onto the top of a slab being cast within a continuous casting mold; the apparatus comprising:

- a source of granular mold flux;
- delivery means to deliver the granular mold flux from the source to the top of a slab being cast within the continuous casting mold, the delivery means including
  - at least one delivery tube assembly including a flexible line, and an inline air pump which assures a positive flow of granular mold flux through the flexible line, and
  - a variable diameter pinch valve for controlling the flow rate of the granular mold flux from the intermediate hopper through the delivery tube, the pinch tube including a rubber sleeve through which the granular mold flux passes, and means to vary the diameter of the rubber sleeve between fully closed, fully open, and a plurality of intermediate positions so that the flow rate of the

granular mold flux through the delivery tube may be varied.

5 13. The apparatus for introducing granular mold flux onto the top of a slab being cast within a continuous casting mold as set forth in claim 12 wherein there is a single delivery tube assembly, the delivery tube having a discharge branches which can deliver granular mold flux to either side of a ceramic pouring tube, the delivery branches being downstream of the inline air pump.

10 14. Apparatus for introducing granular mold flux onto the top of a slab being cast within a continuous casting mold; the apparatus comprising:

a source of granular mold flux;

an intermediate hopper which receives granular mold flux from the source; and

a pone or more delivery tube assemblies interconnected with the intermediate hopper for insuring the feeding the granular mold flux from the intermediate hopper to the top of the slab being cast within the continuous casting mold, each delivery tube assembly including a flexible line, and an inline air pump which assures a positive flow of granular mold flux through the flexible line.

25 15. The apparatus for introducing granular mold flux onto the top of a slab being cast within a continuous casting mold as set forth in claim 14 further provided with a feed control panel wherein an operator may remotely control the flow by either slowing up or stopping the flow if he sees that the flux is building up too high so that it is almost as high as the top of the mold, or by increasing the flow rate if he sees that hot spots are developing or showing through the flux.

5 16. The apparatus for introducing granular mold flux onto the top of a slab being cast within a continuous casting mold as set forth in claim 15 wherein the flow rate is controlled by varying the air volume delivered by the air pump.

10 17. The apparatus for introducing granular mold flux onto the top of a slab being cast within a continuous casting mold as set forth in claim 16 wherein an I/P device is provided for each air pump, the air volume being delivered by the air pump being under the control of the associated I/P device.

15 18. The apparatus for introducing granular mold flux onto the top of a slab being cast within a continuous casting mold as set forth in claim 17 wherein each I/P device is associated with an air volume booster.

*add (3)*